

fluid pass in the direction this hypothesis postulates; that is, from the blood-vessels, into the pericardium.

Similar improbability attaches to a view which supposes a fluid of such chemical and such morphological characters as the blood of the Lamellibranchiata to suffer dilution to such an extent as the observable distention of their foot would necessarily imply, and which argues from phenomena noticed on the sudden removal of the animal from the water as though they could be regarded as identical with normally occurring physiological processes.

As their injections seem to them to prove the existence of a system of vessels distinct from and yet in most close apposition to the blood-vessels and permeating the several tissues of the body in company with them, the facts of the case seem to the authors to necessitate the belief that a transference of fluid takes place, as in other organisms, from the latter to the former set of vessels.

The animals experimented upon were Unionidæ of the two species *Anodonta Cygnea* and *Unio margaritifera*.

MISCELLANEOUS.

On the Larval state of the Muscidæ. By RUD. LEUCKART.

IT is, I think, a very general opinion that, up to their change into pupæ, the headless larvæ of the flies are subject only to such changes as are brought about by their growth and the formation of their generative organs. Wherever any other differences were observed between the newly-hatched and full-grown larvæ, as in the *Æstridæ* (Joly) and the *Pupipara* (Leuckart), these have hitherto been regarded as exceptional cases.

This view is erroneous. Investigations which I made in the course of last summer upon the development of various *Muscidæ* render it probable that the animals belonging to this group in general, like the above-mentioned *Æstridæ* and *Pupipara*, present several different larval forms. The differences of these larval forms do not, indeed, extend so far as to lead one to mistake their genetic relations, but they are nevertheless sufficiently striking to fix the interest and attention of the naturalist.

The differences of these larval forms are most distinctly indicated in the formation of the buccal organs and of the stigmata. Reserving further particulars for a future communication, I will in the following only indicate in a few words the chief differences of the three larval states observed by me in *Musca vomitoria* and *M. cæsarea*.

First stage (duration in summer about twelve hours).—Anterior stigmata wanting. The truncated posterior end bears on each side two closely approximated, cleft-like air-holes. The oral opening, in repose, is a triangular pit, the lateral edges of which converge in front and bear a chitinous ridge, at the anterior extremity of which a number of small teeth follow. When the mouth is opened, the lateral horny ridges separate at their anterior extremity. The pos-

terior lip of the buccal opening forms a cushion-like projection, near which on each side there is a chitinous plate, from which two curved chitinous filaments run outwards. From the mouth a *single* hook can be protruded; this is situated in the depths of the cavity, and attached to a strong chitinous framework.

Second stage (the duration of which may be estimated at thirty-six hours).—The two posterior stigmata are on each side enclosed in a chitinous ring. On the second segment, on both sides, a series of 7–8 new, small air-holes has been formed; these stand close together and open into the same main trachea. The number of hooks in the mouth is increased to two; and these are connected not only with the framework, which has remained essentially unchanged, but also with a transverse chitinous arc, which belongs to the lower lip, and moves up and down in the same way as the lower jaw of a vertebrate animal. From the lateral extremity of this arc there issues, instead of two, a great number of chitinous filaments, which radiate in a fan-like form to the lateral parts of the cephalic segment. Other solid buccal organs are wanting.

Third stage (up to the pupal change).—With three stigmata on each side at the posterior extremity. The margin of the latter has become drawn out into a number of conical processes. In other respects it agrees with the second stage.

The second and third stages are introduced by a change of skin, which extends to the tracheæ in the manner described by me in the *Pupipara*.—*Wiegmann's Archiv*, 1861, p. 60.

On the Structure of the Brain in Man and the Apes, and its relation to the Zoological System. By RUDOLPH WAGNER, Professor at Göttingen.

The following is a short abstract of a paper recently published in *Wiegmann's 'Archiv für Naturgeschichte'* (1861, pp. 63–80).

The author commences by giving a detailed account of the publications of Owen, Huxley, and Gratiolet relating to the subject. The latter, who has lately compared the brain of *Microcephali* with those of Apes*, arrives at the conclusion that Man, in his physical organization, differs as absolutely from the highest animals, as in the development of his psychical qualities,—a view with which Prof. Wagner entirely agrees.

The author having had little opportunity of examining fresh cerebra either of extra-European races of Men or of Apes, has arrived at his opinion less from his own direct observations than from the study of the works of Tiedemann, Leuret, Owen, and Gratiolet. He has, however, obtained casts of the brains of different races of Man, of a microcephalic individual who attained to the age of thirty-one years, and of several Orangs of different ages, by cutting the skulls in two in the direction of the *sutura sagittalis*, and by filling them with plaster of Paris.

* *Comptes Rendus*, 1860, no. 18, and *Mém. Soc. Anthropol. Paris*, i. 1860, p. 64.